

Appl. No. 10/706,901
Amdt. dated February 3, 2006
Reply to Office Action of September 15, 2005

PATENT

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A wavelength selective manipulation device comprising:
at least a first optical input port for inputting an optical signal including a plurality of wavelength channels;
a first wavelength dispersion element for angularly dispersing the wavelength channels of said optical signal into angularly dispersed wavelength signals;
an optical power element for focussing in the dimension of the angular dispersion said angularly dispersed wavelength signals into a series of elongated spatially separated wavelength bands such that said wavelength signals have an elongated optical intensity profile in the focal plane of said optical power element so as to form elongated spatially separated wavelength signals; and
a spatial manipulation element for selectively spatially manipulating the characteristics of said elongated spatially separated wavelength bands-signals to produce spatially manipulated wavelength bands-signals.
2. (Currently amended) A device as claimed in claim 1 further comprising:
a first wavelength combining element for selectively combining said spatially manipulated wavelength bands-signals together to produce a first output signal.
3. (Original) A device as claimed in claim 1 wherein said first wavelength dispersion element includes a diffraction grating.
4. (Original) A device as claimed in claim 1 wherein said focussing element includes at least one cylindrical lens.
5. (Original) A device as claimed in claim 1 wherein said spatial manipulation element comprises a spatial light modulator or liquid crystal display device.

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6. (Currently amended) A device as claimed in claim 5 wherein said liquid crystal display device is divided into a series of elongated cell regions substantially matching the optical intensity profile of said elongated spatially separated wavelength bandssignals.

7. (Original) A device as claimed in claim 6 wherein said cell regions each include a plurality of drivable cells and wherein, in use, said cells are driven so as to provide a selective driving structure which projects a corresponding optical signal falling on the cell region substantially into one of a series of output order modes.

8. (Original) A device as claimed in claim 1 wherein said optical power element also includes a spherical mirror device.

9. (Original) A device as claimed in claim 3 wherein said diffraction grating is utilised substantially at the Littrow condition.

10. (Original) A device as claimed in claim 4 wherein said optical power element includes a spherical mirror.

11. (Currently amended) A device as claimed in claim 1 wherein:
when said spatial manipulation element is in a first state, first predetermined wavelengths input at said first optical input port are output at a first output port; and
when said spatial manipulation element is in a second state, second predetermined wavelengths input at said first optical input port are output at a second output port,

12. (Original) A device as claimed in claim 11 wherein:
when said spatial manipulation element is in said first state, first predetermined wavelengths input at a third optical input port are output at a fourth output port; and
when said spatial manipulation element is in a second state, first predetermined wavelengths input at said third optical input port are output at said first output port.

13. (Currently amended) A wavelength selective manipulation device comprising:

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4-a series of optical input and output ports including a first optical input port inputting an optical signal including a plurality of wavelength channels;

a first wavelength dispersion element for angularly dispersing the wavelength channels of said optical signal into angularly dispersed wavelength signals;

an optical power element for focussing said angularly separated wavelength signals into a series of elongated spatially separated wavelength bands;

a spatial manipulation element for selectively spatially manipulating the characteristics of said angularly separated wavelength bands to produce spatially manipulated wavelength bands; and

said spatially manipulated wavelength bands being subsequently focused by said optical power element and combined in a spatially selective manner by said first wavelength separation dispersion element for output at said output ports in a spatially selective manner.

14. (Currently amended) A method of providing wavelength selective separation capabilities for an optical input signal having multiple wavelength components, the method comprising the steps of:

(a) projecting the optical input signal against a grating structure so as to angularly separate said wavelength components;

(b) focussing each of said wavelength components into an elongated wavelength component element having an elongated optical intensity profile;

(c) independently manipulating said elongated wavelength component element;
and

(d) combining predetermined ones of said manipulated elongated wavelength components.

15. (Original) A method as claimed in claim 14 wherein said focussing step includes utilising a cylindrical lens to focus the wavelength components.

16. (Original) A method as claimed in claim 14 wherein said focussing step includes utilising a spherical mirror to focus the wavelength components.

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17. (Original) A method as claimed in claim 14 wherein said step (c) includes utilising a liquid crystal display device to separately manipulate each of the wavelength components.

18. (Currently amended) A method as claimed in claim 17 wherein said liquid crystal display device is divided into a series of elongated cell regions substantially matching said optical intensity profile of said elongated-wavelength component elements.

19. (Original) A method as claimed in claim 18 wherein said cell regions each include a plurality of drivable cells and wherein, in use, said cells are driven so as to provide a selective driving structure which projects a corresponding optical signal falling on the cell region substantially into one of a series of output order modes.

20. (Original) A method as claimed in claim 14 wherein said focussing step includes utilising a spherical mirror.

21. (Currently amended) A wavelength selective manipulation device comprising:
a at least a first optical input port for inputting an optical signal including a plurality of wavelength channels;

polarisation alignment element for aligning the polarisation state of said optical signal;

a wavelength dispersion element for angularly dispersing the wavelength channels of said optical signal into angularly dispersed wavelength signals;

an optical power element for focussing the angularly dispersed wavelength signals into a series of elongated spatially separated wavelength bands; and

a spatial manipulation element for selectively spatially manipulating the characteristics of said spatially separated wavelength bands to produce spatially manipulated wavelength bands.

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22. (New) A device as claimed in claim 1 wherein the optical intensity profile of each of the elongated spatially separated wavelength signals has an aspect ratio of greater than 10:1 in the plane of the spatial manipulation element.

23. (New) A device as claimed in claim 1 wherein the optical intensity profile of each of the elongated spatially separated wavelength signals has an aspect ratio of approximately 35:1 in the plane of the spatial manipulation element.

24. (New) A method as claimed in claim 16 wherein the optical intensity profile of each of the elongated wavelength component element has an aspect ratio of greater than 10:1.

25. (New) A wavelength selective manipulation device comprising:
a series of optical input and output ports including a first optical input port inputting an optical signal including a plurality of wavelength channels;
a first wavelength dispersion element for angularly dispersing the wavelength channels of said optical signal into angularly dispersed wavelength signals;
an optical power element for focussing said angularly separated wavelength signals such that said wavelength signals have an elongated optical intensity profile in the focal plane of said optical power element so as to form elongated spatially separated wavelength signals;
a spatial manipulation element for selectively spatially manipulating the characteristics of said elongated spatially separated wavelength signals to produce spatially manipulated wavelength signals; and
said spatially manipulated wavelength signals being subsequently focused by said optical power element and combined in a spatially selective manner by said first wavelength dispersion element for output at said output ports in a spatially selective manner.